An updated survey of the distribution of the stick insects of Britain

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Abstract

Since the 1995 British stick insect survey (Lee, 1995), around 40 further reports have been received, including some at new locations. This report summarises 180 reports from 38 localities and comments on the life cycle, predators, and foodplants of the British phasmids.

Key words

Phasmida, *Acanthoxyla prasina geisovii*, *Acanthoxyla prasina inermis*, *Acanthoxyla prasina prasina*, *Clitarchus hookeri*, *Bacillus rossius*, Distribution, United Kingdom, Eire.

Introduction

Since the 1995 stick insect survey (Lee, 1995), around 40 further reports have been received, including some at new locations. Photographs accompanying several of these reports have enabled identification of the species present in most of the new locations, as well as in some sites where the species was formerly unconfirmed. Prior to commencing this survey almost 50 sightings in 18 locations had appeared in print. This paper brings the total to some 180 reports in 38 locations. This large number gives a clear picture about how these parthenogenetic insects are adapting to their alien environment in respect of life cycle, foodplants and predators.

Life Cycle

Principally, nymphs emerge from the egg in spring. The tiny nymphs are much more easily spotted after dark. Throughout the year, I record the moths which settle beneath my outside lights, so from March onwards this nightly monitoring is extended to include a torchlight check of garden bushes. The earliest I have recorded a first instar nymph was a singleton on 1st April this year on a climbing rose, but the main emergence is towards the end of the month. In 1997 the only nymphs in my garden were a first instar on 15th April, and a second instar on 10th June. In 1996, three first instars were spotted on 24th April on a small potentilla bush. Within three days this had increased to 10, and two days later to 26. On the night of 3rd May 56 were observed, all on that same bush. Evidence of how well they hide during the day came the following morning, when 15 minutes of searching the bush (approximately 60cm high, 1m across, and 30cm deep against a north east facing wall) found only 12 nymphs all clamped tight against the stems with their front and middle legs facing forward along the body, and their rear legs facing backwards. That night 56 were there again, prominently up on their legs with their abdomen arched over their backs.

Whilst spring is clearly the main time for emergence, occasional first instars have been recorded in summer and autumn. After a very hard frost at the end of November 1993, followed by a period of mild weather, a dozen first instars were seen on a bush in Port Isaac in mid December. In New Zealand, insects have had many thousands of millennia to standardise their emergence with the seasons, but it seems that complete synchrony has still to happen here. Adults from the spring emergence have been found in my garden from mid July through into January. From all the survey reports, adults have been seen in every month of the year and some insects are most clearly able to survive hard frosts. An article in the *West Briton* newspaper on 13th February 1997 brought in nineteen reports, no less than nine of which were of insects seen in the previous few weeks, and from six separate Cornish locations. Two Port Isaac sightings were also made that January. The period around Christmas 1996 and into January 1997 had been one of the coldest on record, with 10 days of subzero temperatures, yet all these insects from many different parts of Cornwall had survived those frosts and were still active.

As previously recorded (Lee, 1993), these insects can lay more than 200 eggs in their lifetime. The brown insect referred to in that report, which was kept indoors over the winter, eventually laid 694 eggs in 166 days, an average of 4.2 eggs per day: on some days it layed 8 or 9 eggs. Outdoors, most eggs would be laid in late summer, or early autumn, before the onset of cold weather. This suggests an incubation period of six to eight months before eggs hatch to start the annual cycle again.

Foodplants

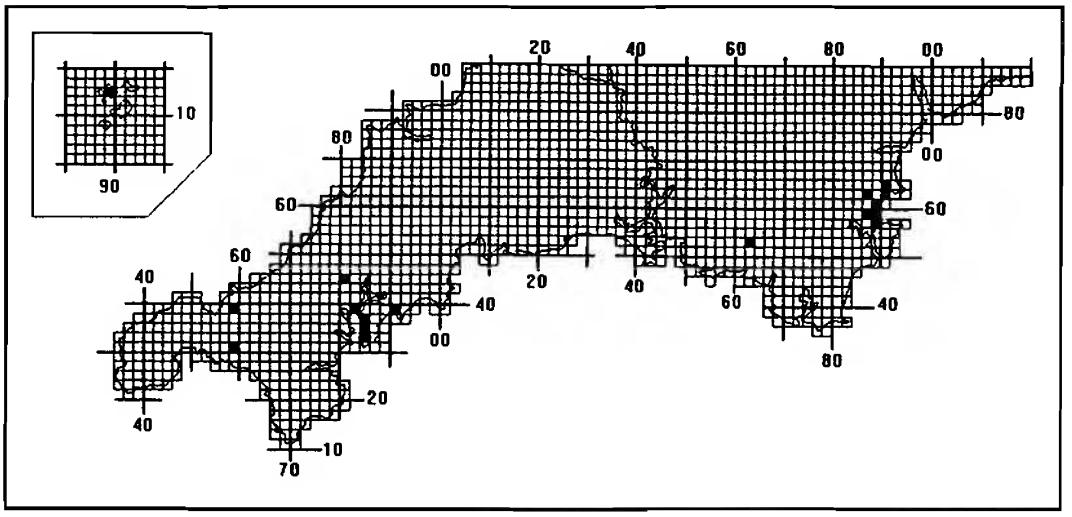
There have been a considerable variety of garden plants mentioned, and it seems likely that these insects are widely polyphagous here. Since eggs are simply dropped below the plant on which the parent is feeding, next year's nymphs are most likely to climb onto that same plant when they hatch out. Were it to climb up an adjacent, but unsuitable, plant, the nymph would die and a new colony would not be started. The most frequently reported foodplants are Rosaceae (roses, brambles, raspberry and potentilla) and conifers, especially *Leylandii* hedges. Other species mentioned are *Ceanothus* sp., *Cistus* sp., *Dahlia* sp., *Erica arborea*, *Erica erigena*, *Erica lusitanica*, *Fuchsia* sp., honeysuckle, myrtle, pittosporum and red valerian. From the reports received, there is no difference in foodplants between either *Acanthoxyla* subspecies.

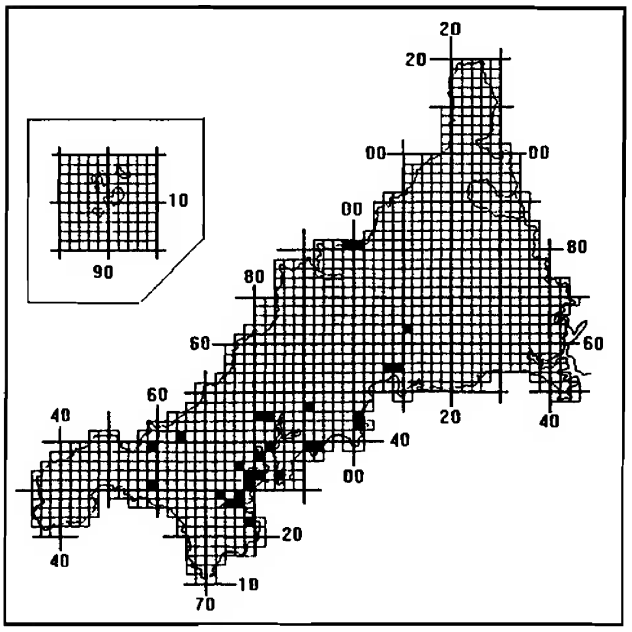
Predators

If the potential life inside every egg were to make it to a mature adult, simple arithmetic shows that we would be overwhelmed with stick insects in just a few years. That this rarely happens must mean that most of this potential life fails. With each insect laying several hundred eggs, an overall mortality of 99% would still lead to an increasing population. Undoubtedly there are many causes for failure, but the survey gave several examples of predation. Most commonly reported were birds feeding on small nymphs. Nymphs keep a very low profile, but will often move if disturbed. A bird foraging for food may accidentally disturb an insect and, once seen, a colony could be decimated in a very short time. Three reports spoke of adults or nymphs being attacked by "wasps". When used by a non-naturalist, the term "wasps" could mean almost any yellow and black Hymenoptera, not necessarily of the family Vespidae. Chris Haes (pers. comm.) has observed moribund adults and active nymphs being attacked by wasps, which were confirmed as common wasps (*Vespula vulgaris*). Chris observed insects being bitten and cut up, presumably to get them into the nest for feeding to the larvae. A daddy-long-legs spider (*Pholcus phalangioides*) was observed and photographed eating a third instar nymph which it had caught.

Survey Results

The report below lists all recorded sites, together with 1km Ordnance Survey squares. Where recent records have not been received, the date of the last record is given. Corrections to my last report (Lee, 1995) are also included. With the exception of specific requests in the Ivybridge area, few of my articles since 1995 have reached outside Cornwall, so there is a distinct Cornish bias. Plotting all reports to date on large scale maps reinforces my 1995 comments on the very localised nature of colonies in all areas, with the possible exception of those around the Helford River (Budock Vean, Glendurgan, Helford Passage and Trebah, and possibly including Mawnan Smith) which may be one large colony.





British Stick Insect Locations

Top: *Acanthoxyla prasina geisovii* (Kaup).

Left: *Acanthoxyla prasina inermis* Salmon.

These tetrad (2km x 2km) maps show all the recorded locations of both our widely distributed species within Britain. All tetrad records are post-1984. *Clitarchus hookeri* (White) is only found on Tresco, Isles of Scilly in the same tetrad as *Acanthoxyla prasina geisovii*.

(a) Cornwall

ANGARRACK (SW5838): Insects continued to be found in one garden up to this spring, and have also been reported in neighbouring gardens. *A. p. inermis* is present, as well as *A. p. geisovii* and *Acanthoxyla prasina prasina* (Westwood). All originated from a spillage of eggs. An unusual over-wintered *A. p. geisovii* was recorded this spring, in which the insect was brown, but with green upper parts. (Chris Haes, pers. comm.)

BLISLAND SCHOOL (SX1072): No reports since Lee, 1995. No reason to doubt a colony still exists in the school grounds. Species present not confirmed, but likely to be *A. p. inermis*, probably originating from the Penryn distribution to Cornish schools. Last record: 1992.

BUDOCK VEAN (SW7527): Three 1997 reports. A clear photograph from one garden was of *A. p. inermis*. This site was only a 100m from the 1990 report of *A. p. geisovii* (Brock, 1991), which Lee (1995) considered was an error for *A. p. inermis*. The photograph confirms *A. p. inermis* is the species present here.

BUDOCK WATER (SW7832): This village is just to the west of Falmouth, and was previously (Lee, 1995) included with that location. A sighting report was received via

Chris Haes shortly before writing the 1995 report. Subsequent efforts to obtain further information have been inconclusive, and no other reports have been received. The proximity to the Falmouth *A. p. inermis* colonies leads me to conclude the report was likely to be valid. The record was most likely in 1994.

CONSTANTINE (SW7329): A new location. One report in 1996 of four insects in a single garden on a Privet bush. A clear photograph sent subsequently showed they were *A. p. inermis*. The photograph also showed bramble mixed in the Privet bush, and those bramble leaves showed clear evidence of feeding bites, so the Privet was incidental. The location is not close to any school, and I suspect the insects arrived in a nearby garden on plants from Treseder's nursery.

FALMOUTH (SW7931, SW7933, SW8032, SW8033): Four reports received in 1997: three from around the 1981 colony, and one from a close in west Falmouth. The species which has been confirmed as present in Falmouth is *A. p. inermis*. The CBRU report of *A. p. geisovii* (which Lee (1995) felt was in error) was in October 1992 in Neil Treseder's garden (SW7933), although Chris Haes only found *A. p. inermis* on visiting the garden in 1993. A report of another Falmouth *A. p. geisovii* has not proved possible to track down, so this species' presence requires confirmation.

FEOCK (SW8238): No new reports, but no reason to doubt both *A. p. inermis* and *A. p. geisovii* are still present here. The last *A. p. geisovii* record was in 1987, the last *A. p. inermis* was in 1993.

GLENDURGAN (SW7727): In July 1995 a visit to this garden with Chris Haes found evidence of feeding near an old nursery, but no stick insects. On 27th July 1995, Rob James, Head Gardener, found a 5cm nymph on a pittosporum plant in that old nursery. Species confirmed as *A. p. inermis* by Lee (1995).

GREAT WORK (SW5930): No new reports, but no reason to doubt both *A. p. inermis* and *A. p. geisovii* are still present here. Last record: 1993.

HELFORD PASSAGE (SW7527, SW7626, SW7627): One 1997 report, accompanied by a clear photograph of *A. p. inermis*. Lee (1995) concluded that the earlier references to *A. p. geisovii* at this location were in error.

MAWNAN SMITH (SW7728, SW7729): Four 1997 reports from several parts of this large village. Species present is *A. p. inermis*, (Lee, 1995).

MEVAGISSEY (SX0144, SX0145): One 1997 report. Species present confirmed as *A. p. inermis*, (Lee, 1995).

MYLOR BRIDGE (SW8036): A new location. One 1997 report, accompanied by a clear photograph of *A. p. inermis*. The origin of the colony is most likely to have arisen from plants from Treseder's nursery in a nearby garden.

PENRYN (SW7734, SW7735): Two reports in 1996 and three in 1997. All came from the same estate in North Penryn where insects were released in 1982. Species is *A. p. inermis*, (Lee, 1995).

PORT GAVERNE (SX0080): Present in my own garden in 1995, 1996, 1997 and 1998. The species present here was confirmed as *A. p. inermis* by Lee (1993).

PORTHALLOW (SW7923): A new location. One report in 1997 was accompanied by clear photos of *A. p. inermis*. Insects have been present here for some years. This location is some distance from the nearest stick insect site. The house has a New Zealand name, and the garden was laid out many years ago with New Zealand plants. It is not known whether they were obtained from Treseder's nursery, or imported direct, either of which would be a likely source of origin.

PORT ISAAC (SW9980): Many reports in 1995, 1996, 1997 and 1998. The species present here was confirmed as *A. p. inermis* by Lee (1993).

PORTMELLON (SX0143): A new location adjacent to Mevagissey. One 1997 report. The owner of the garden regularly exchanges plants with a friend in Mevagissey who lives in a street where there have been several stick insect reports. This is the undoubted source of these insects, in which case the species present will prove to be *A. p. inermis*.

PROBUS (SW9047): One 1997 report from the same close as earlier reports. The species present has been confirmed as *A. p. inermis*, (Lee, 1995).

ROSEWARNE (SW6441): A new location. Two 1997 reports, 100m apart. The species present is not confirmed, but one report was of a 12cm non-spiny insect on raspberry canes, strongly suggesting *A. p. inermis*.

ST IVES: No further information from this site reinforces the conclusion (Lee, 1995) that this report was of discarded Laboratory stick insects *Carausius morosus* (Sinéty).

ST JUST-IN-ROSELAND (SW8535): No new reports, but no reason to doubt *A. p. geisovii* is still present here. Last record: 1994.

ST MAWES (SW8432, SW8433, SW8532, SW8533): Very surprisingly, the February 1997 "West Briton" article, which produced a total of nineteen sightings, gave none from this area. The continuing existence of insects from one of the garden sites mentioned by Lee (1995) was confirmed by letter in 1996. Despite this lack of reports, there can be no reason to doubt these insects remain well established here. The principal species present is *A. p. geisovii*, with *A. p. inermis* in one garden at least. *Acanthoxyla p. prasina* and *Bacillus rossius* (Rossi) were reported as present in small numbers in one garden (Lee, 1995), but it is not known if they still survive.

TREBAH GARDENS (SW7627): A new location. One 1996 report via Chris Haes. Mike Paviour, garden manager, found an insect in the garden on 9th August. From the description, Chris was able to confirm it was *A. p. inermis*. Although the garden has many New Zealand plants, this garden is adjacent to Glendurgan, and near to several *A. p. inermis* sites, so insects probably moved into the garden by natural spread.

TRETHEM (SW8536): A new location. Two 1997 reports: a 7cm nymph in February, and two 12cm adults in August which had black spines on their body. From the description, the species is *A. p. geisovii*. This site is only a few kilometres from St Mawes, and St Just-in-Roseland, and they probably arrived here via children finding them in one of these sites and bringing them back.

TRESCO (SV8914, SV8915): No new reports, but no reason to doubt both *Clitarchus hookeri* and *A. p. geisovii* are still present. The last *C. hookeri* record was in 1992; the last *A. p. geisovii* in 1993.

TRURO (SW8044, SW8244, SW8245, SW8345): Seven new reports: one in 1995, one in 1996, and five in 1997. A clear photograph from the 1996 report (in a garden on the former site of Treseder's nursery) was of *A. p. inermis*, confirming that this is the species present here. The day after the final proof of my last report (Lee, 1995) had been sent back to the editor, I received a report from a west Truro garden together with a photograph of the insect. This was unclear, having been taken without the benefit of a close up lens. Both Chris Haes and Paul Brock agreed with me that the photo had the look of *A. p. geisovii*, but as the image was so small none of us could be certain. The owner of the garden was asked to keep a look out for more insects, and on 22nd July 1995 the owner forwarded the remains of a nymph which had been attacked by "wasps". There was no doubt whatsoever that this was *A. p. geisovii*, a new location for this species in 1km OS square SW8044. One of the 1997 reports was from an adjacent garden, and was likely to have been *A. p. geisovii* as well. One other report (in Lee, 1995) was from SW8044, but 400m from this site. It is not known which species was in that garden. In Cornwall there are few confirmed reports of

A. p. geisovii outside of the St Mawes area, so the origin is a mystery. It is known that Victor Heath, who introduced *A. p. geisovii* to St Mawes, sent plants to other Cornish gardens (West Briton, 1969) and this may be a possible source for the insects.

TYWARDREATH (SX0754, SX0854): No new reports, but no reason to doubt the colony still exists. Species not confirmed, but most likely *A. p. inermis*. Last record: 1994.

VERYAN (SW9139): No reports since Lee (1995), but no reason to doubt *A. p. geisovii* is still present here. Last record: 1994.

VERYAN GREEN (SW9139, SW9239): No new reports, but no reason to doubt *A. p. inermis* is still present here. Last record: 1994.

(b) Devon

BROADSANDS (SX8957): Not in Lee (1995). Colin Bath, Curator Paignton Zoo, received a 1986 record of *A. p. geisovii* from this location. No subsequent reports, but no reason to doubt a colony still survives here.

COLLATON-ST-MARY (SX8659): Not mentioned by Lee (1995). The earliest record from this site was in the Paignton Observer of 2nd January 1947, where Herbert Whitley reported finding a crushed and dead insect in the Collaton area. This site is only a kilometre or so west of Paignton Botanical Gardens and Zoo, where *A. p. geisovii* has been known for a long time. They may have spread there by children taking them home, by transfer of plants between the sites, or even by natural spread. Colin Bath received a 1986 record from St Mary's School, and there is no reason to doubt that a colony of *A. p. geisovii* still survives here.

ERMINGTON (SX6352, SX6353): Two newspaper articles in March 1998 brought three reports from this village. At one site, the owner reported that it was he who had sent one of his garden stick insects up to the Natural History Museum *c.*1983, which was confirmed as *A. p. geisovii*. He was also able to offer an explanation as to how they had arrived in his garden. In *c.*1975 his company was responsible for demolishing Paignton Corporation Nursery, and he had brought back plants from there to his garden. Insects were first seen the following year and have been seen regularly ever since. He often receives stick insects from other parts of the village with the comment "Here is one of your insects I am returning", so they have clearly become widespread there in the last 20 years.

GALMPTON (SX8856, SX8956): No new reports, but no reason to doubt *A. p. geisovii* is still present here. Last record 1994.

IVYBRIDGE: Ermington should now be used for all previous "Ivybridge" reports.

MARLDON (SX8662, SX8663): Not in Lee (1995). In August 1985, Colin Bath wondered whether the Torbay insects were dying out, as he knew of only two stick insect sightings in the previous 12 months, one of which was from a garden in Marldon (Western Morning News, 1985). No subsequent reports, but no reason to doubt a colony of *A. p. geisovii* still survives.

PAIGNTON (SX8759, SX8859, SX8860, SX8861): One 1996 report. Species present is confirmed as *A. p. geisovii*. Claude Rivers, who rediscovered stick insects at Paignton in 1952 (Rivers, 1953), kindly provided me with some previously unpublished correspondence which he received following his 1953 "Country Life" article (of which Rivers (1953) was an adaption). This was from a lady who, as a 10 year old child, returned in May 1903 from New Zealand with her father Edward Kirby (presumably no relation to the W.F. Kirby who reported Mrs Arbuthnot's 1908 find (Kirby, 1910)) and stayed temporarily at Paignton, near the railway station. The family had returned on the ship *Corinthic* with a large box of young New Zealand shrubs embedded in

earth, which was kept on deck for daily watering and attention. Coincidentally, she also remembers her teacher in Paignton was a Miss Arbuthnot. Shortly after, the family moved to London and the plants were left behind. Where the family stayed in 1903 is only a few hundred metres from where Claude Rivers found the 1952 insects, and this may well have been their source. This is four years earlier than the report of plants being sent from Tresco Abbey Gardens to Paignton (presumably the botanical gardens, where insects have been known for a very long time) in 1907 (Uvarov, 1944). The Botanical gardens are some 1500m from where Rivers found the insects, and experience in other locations shows that colonies are very localised with an extremely slow rate of natural spread (eg. Truro around Treseder's nursery: 400m from the 1920s to date; Port Isaac: 200m from 1983 to date; Falmouth main colony: 300m from mid-1970s to date). The possibility exists, as found at other locations, that there may well have been more than one introduction here.

TORQUAY (SX9063, SX9064, SX9164): No new reports, but no reason to doubt *A. p. geisovii* is still present here. The last Palm House area (SX9063) record was in 1985. Colin Bath received a report in the late 1980s from km square SX9164. The last Torbay Mill record (SX9064) was in 1947.

(c) Eire

BAY OF KENMARE, COUNTY KERRY: No new reports, but no reason to doubt *A. p. inermis* is still widespread here. Records include: Claddananure in 1994 (Lee, 1995), the Island of Rossdohan, Viscount Mersey's Estate opposite the island, and nearby Kilmakillage Harbour; the latter three have been known since the 1960s, but the insects were likely there much earlier, arriving on Treseder's plants.

(d) Other stick insect reports

BANFF, SCOTLAND: A single insect was seen on a montbretia plant in September 1996. This was undoubtedly a discarded *Carausius morosus*.

DARTFORD, KENT: Rivers (1953) noted the keeping outdoors of the *A. p. geisovii* collected from Paignton. Claude Rivers informed me that, following advice by Herbert Whitley at Paignton Zoo, they were kept outdoors on cypress. They undoubtedly laid many eggs outdoors, but there is no evidence that any of these survived, nor, with the heavy frosts expected at this location, was it likely that they would. I merely note this location in Shepherds Lane, Dartford for the record.

HILLINGDON, NORTH LONDON: McNamara (1996) reported a single adult female *Bacillus rossius* found in July 1994 resulting from a deliberate release in 1986. McNamara rules out releases subsequent to 1986, and concludes the insects have survived outdoors for eight years. Other reports of this species surviving outdoors are from St Mawes (Lee, 1995) and Plympton (Lee, 1995; Jope, 1996).

PORTHCAWL, SOUTH WALES: A single insect found in a garden about 1967. This was undoubtedly a discarded *Carausius morosus*.

STRATFORD-UPON-AVON, WARWICKSHIRE: The distribution map in Haes & Harding (1997) shows a stick insect record for Warwickshire. Chris Haes advises that *Carausius morosus* are well established under glass at a butterfly farm near Stratford-upon-Avon, having been present for some years.

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The new information from Claude Rivers was greatly appreciated, particularly the 1953 correspondence giving a fresh light on the Paignton story. On a sad note, I have to record the death in December 1996 of Neil Treseder, whose family nursery is inextricably linked with the British stick insect story. His ready assistance and first hand information was invaluable, confirming the earliest commercial importations of New Zealand flora to Britain, the supply of New Zealand plants to Viscount Mersey in the Bay of Kenmare, Ireland, and the presence of *A. p. inermis* in Truro back to the 1920s.

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